Koneru Lakshmaiah Education Foundation
(Category -1, Deemed to be University estd. u/s. 3 of the UGC Act, 1956)
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Department of Computer Science and Applications

Program: MCA

Academic Year :2023-2024

COURSE CODE	COURSE TITLE	CO. No.	Course Outcome
23CA5101	COMPUTER NETWORKS AND COMMUNICATIONS	CO1	Demonstrate how to establish a connection among various devices. Explain the different networking concepts and devices that are used today for establishing connectivity.
		CO2	Outline the functionalities of different network protocols
		CO3	Explain different WAN technologies, topologies and other basic networking concepts.
		CO4	Show how to troubleshoot a network.
		CO5	Evaluate the programs and should be implemented, implementing protcols and routing agorithms.
23CA5102	DATA STRUCTURES AND ALGORITHMS	CO1	Outline basic data structures such as arrays, pointers
		CO2	Demonstrate the basic structure such as stacks and queues.
		CO3	Solve problem involving trees and Linked List
		CO4	Apply Algorithm for solving problems like sorting,searching, insertion and deletion of data
		CO5	Evaluate applications using control structures for linearand non-linear data structures
		CO6	Asses the data structure for its functions based on perfromance metrics.
23IE5201	ESSESTIALS OF RESEARCH DESIGN	CO1	Illustrate Research objects, steps involved in research and articulate appropriate Research Questions
		CO2	Perform Literature Review in a Scholarly style and apply appropriate methods for Data collection
		CO3	Represent the data in tabular/Graphical form and prepare data for analysis
		CO4	Perform statistical modelling and analysis to optimize the data, prepare the data for publishing.
23CA5103	OPERATING SYSTEMS	CO1	Explain overview of Operating System and basic Operating systems
		CO2	Discover Process state and scheduling with different algorithms
		CO3	Apply Process Synchronization and Dead lock prevention and avoidance.
		CO4	Organize various paging concepts and it's algorithms
23CA5104	DATABASE SYSTEMS	CO1	Illustrate the functional components of DBMS and Design an ER Model for a database.
		CO2	Design a relational model for a database & Implement SQL concepts and relational algebra.
		CO3	Implement PL/SQL programs, normalization techniques,

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			indexing to construct and access database
		CO4	Analyze the importance of transaction Processing, concurrency control and recovery techniques.
		CO5	Choose the MangoDB to perform CURD,Indexing,Aggregation, Replication, Sharding, Performance analysis for distrubuted Databases
		CO6	Choose a MongoDB and implement SQL queries and PL/SQL programs to do various operations on data.
23CA5205	OBJECT ORIENTED PROGRAMMING	CO1	Understand Principles of OOP and Inheritance
		CO2	Design and Implement interfaces, Packages and Enumeration, Exceptions & Assertions
		CO3	Analyze Multi-Threading and Applets
		CO4	Apply Event Handling and Abstract Window Toolkit
		CO5	solve varies problem using oops techniques
		CO6	Create awt and swing packages
23CA5206	DATA ANALYTICS	CO1	Summarize the importance and environment of R Programming
		CO2	Experiment with basic control and functions in R
		CO3	Examine the function of datastructures in R
		CO4	Inference data analysis pattern suing Statistics and Data visualization
		CO5	Experiment with pattern detection and data analytics function with data set
		CO6	Examine statistical, data structures and data frame manipulation
23CA5207	COMPREHENSIVE SOFTWARE ENGINEERING	CO1	Demonstrate the requirement of software development for various applications.
		CO2	Explain how to reduce the complexity to transition from one phase in software development to another.
		CO3	Summarize different testing concepts
		CO4	Develop and manage a software development project
22CA6108	WEB TECHNOLOGIES	CO1	illustrate the basic concepts of HTML and CSS & apply those concepts to design static web pages
		CO2	Identify and understand various concepts related to dynamic web pages and validate them using JavaScript
		CO3	Apply the concepts of Extensible markup language
		CO4	Examine web Applications using Scripting Languages & Frameworks
		CO5	Create and deploy secure, usable database driven web applications using PHP
		CO6	Design Dynamic Web Pages by using HTML, CSS, JS, PHP
23UC5201	PROFESSIONAL COMMUNICATIO	CO1	To develop and demonstrate principles of listening, speaking, reading and writing in various functional contexts
		CO2	To demonstrate different types of personal and professional skills and apply them for growth in professional zone.

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	N SKILLS	CO3	Apply the concepts of Mathematical Principles to solve problems on Arithmetic , Algebra & Geometry to improve problem solving ability.
		CO4	Apply the concepts and using Logical thinking to solve problems on verbal & Non-Verbal Reasoning to develop Logical thinking skills.
23CA52A1	APPLIED MACHIN E LEARNI NG	CO1	Demonstrate the types of machine learning model representation and Supervised Learning- Simple Linear Regression Analysis
		CO2	Implementing Multiple Regression model for supervised learning
		CO3	Experimenting Multiple Linear Regression model
		CO4	Estimating various Regression coefficient
		CO5	Evaluate applications using linear regression techniques
		CO6	Developing Solutions for the real-wrold problems using Python programming.
23CA52A2	PATTER N RECOGN ITION	CO1	Understand basic concepts in pattern recognition.
		CO2	Understanding Generative Learning Models.
		CO3	Understand Structured pattern recognition and Neural pattern recognition.
		CO4	Apply pattern recognition techniques in practical problems.
23CA61A3	COMPUT ER VISION	CO1	Illustrate the need for image transformations and modeling, different types of image transformation, and their properties.
		CO2	Apply the techniques and transformation methods for image enhancement and image restoration.
		CO3	Demonstrate image processing algorithms to perform feature detection, matching, segmentation and recognition.
		CO4	Apply and analyze NN, ML, and DL algorithms for image transformation, pose consistency, and segmentation.
		CO5	Analysis and study of image processing and machine learning algorithm for computer vision
		CO6	Evaluate and apply the algorithms used in computer vision
23CA61A4	APPLIED DEEP LEARNI NG	CO1	Explain the concepts of Perception, Back Propagation, PCA, Singular Value Decomposition
		CO2	Compare Autoencoders, Regularization, Denoising, Convolutional Neural Networks,
		CO3	Construct Long Short Term Memory (LSTM) Restricted Boltzmann Machines, Deep Dream, GRU, Neural style transfer,
		CO4	Build Markov models, Markov networks, Markov chains, Variational autoencoders, Autoregressive Models, and Generative Adversarial Networks (GANs).
23CA61A5	APPLICA TIONS OF NATURA L LANGUA GE PROCESS ING	CO1	Summarizing the significance, Challenges and Applications of NLP
		CO2	Experimenting tokenization and preprocessing raw text
		CO3	Discriminating word Embedding Techniques
		CO4	Categorizing various classification methods in NLP
		CO5	Assessing Different Preprocessing and Prediction Techniques in

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			NLP
23CA52D2	HADOOP AND BIGDATA	CO1	understand the basic concept of BigData, different types of Data
		CO2	understand architecture of Hadoop and YARz
		CO3	Outline Processing and Storage Layer of Hadoop, internal concept of MapReduce
		CO4	Demonstrate the concept of Master and Slave Architecture
23CA61D3	DATA VISUALISATION TECHNIQUES	CO1	Understand the need of visualization techniques
		CO2	explain Static Graphical Techniques
		CO3	apply Multivariate Graphical Techniques
		CO4	Model the concept of Graphical Validation and customization
		CO5	Evaluate programs on data visualization using Tableau or JupyteR tool
		CO6	Evaluate the visualization techniques using tools
23CA61D4	STATISTICS FOR DATA SCIENCE	CO1	Explain the basic concepts of statistics and explains the various methods of descriptive data collection and analysis
		CO2	Show the probability distribution of a random variable, based on real-world situation, and use it to compute expectation and variance
		CO3	Construct the linear and non-linear regression lines for the given data.
		CO4	Apply basic concepts of statistics and explains the various methods of descriptive data collection and analysis
23CA61D5	GRAPH & WEB ANALYTICS	CO1	Understand the impact of big data on graphs ,Network Basics and Social Networks
		CO2	Make use of Web Analytics:- Data sources, tools, Web traffic data
		CO3	Analyzing Web Analytics Strategy- website traffic analysis, audience identification and segmentation analysis, Emerging Analytics
		CO4	Compare Email Testing Analysis, competitive Intelligence Analysis and Social ,Mobile, Video Analysis
		CO5	Python for graph and web analytics
23CA52C1	CLOUD COMPUTING	CO1	Employing and relate the features of Scalable Computing and System models for Distributed and Cloud Environment
		CO2	Operating and Applying Implementation levels of Virtualization mechanisms in Distributed and Cloud Environment
		CO3	Choosing and Sketch out Estimate Service models and Architectural Design for Resource management in Distributed and Cloud Environment
		CO4	Interpreting and demonstrating Ubiquitous feature in Cloud environment and Cloud Software Programming Environments
		CO5	Evaluate the Formulations and Design the Workload balancing in between resources and Virtualization of resource usage in Distributed Cloud Environment
		CO6	Evaluate virtualization, estimate service models and demonstrate cloud environments.

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23CA52C2	CLOUD INFORMATION SECURITY	CO1	Explain the basic concepts of cloud computing, virtualization, and the importance of Information Security in the Cloud Context
		CO2	Discuss various vulnerabilities, controls, and protocols in the cloud
		CO3	Classify the cloud vulnerabilities and threats
		CO4	Outline how cloud and Security works in a seamless model
23CA61C3	CLOUD ARCHITECTURES	CO1	Classify cloud computing importance and services
		CO2	Relate cloud services & models.
		CO3	Explain Virtualization and its applications.
		CO4	Apply cloud services using web services Cloud to utilize cloud resources.
		CO5	Measure various cloud services using web services Cloud for building and deploying applications.
		CO6	Evaluate the cloud services and its applications
23CA61C4	CLOUD SERVERLESS COMPUTING	CO1	Understand the concepts of Cloud Serverless Computing
		CO2	Organize the Serverless cloud Architecture
		CO3	Experiment with the appropriate methodologies of testing and debugging serverless functions
		CO4	Implement knowledge representation using Event-driven Programming in Serverless Architectures
23CA61C5	CLOUD WEB SERVICES	CO1	Summarize the model of Cloud Computing As A Service
		CO2	Illustrate the Networking Basics required for cloud services
		CO3	Demonstrate the Control of workflow in cloud services
		CO4	Explain the method of fault tolerance in cloud
23CA52S1	CYBER SECURITY AND ETHICAL HACKING	CO1	Understand the need for cyber security
		CO2	Analyze various types of security threats and electronic payment systems
		CO3	Analyze the security issues involved in developing secure information systems
		CO4	Compare different ethical hacking methods
		CO5	Analyze various cyber security threats
		CO6	Compare different ethical hacking methods and tools
23CA52S2	CYBER FORENSICS	CO1	Understand Forensic Science and Recovery methods
		CO2	Analyze Digital Evidence, Network Forensicsand Mobile Device Forensics
		CO3	Analyze Web Forensics and Email Forensics
		CO4	Analyze the security policies, standards and cyber laws
23CA61S3	MALWA	CO1	Understand the basics of Malware analysis

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	RE ANALYSIS	CO2	Organize the concept of dynamic analysis
		CO3	Build the concept of Virtual machines in Malware analysis
		CO4	Analyze the Exception handling in malware analysis
		CO5	Analyze the Exception handling in malware analysis
		CO6	Practising with malware analysis tools
23CA61S4	SECURITY GOVERNANCE AND MANAGEMENT	CO1	To develop knowledge of e-governance and e-government
		CO2	To know different e-governance models and infrastructure development
		CO3	To implement security in e-governance
		CO4	To use data warehousing and mining in e-governance
23CA61S5	CLOUD SECURITY	CO1	Understand the principles of cryptography and Apply various cryptographic algorithms
		CO2	Analyze various security issues and system vulnerabilities in virtualization
		CO3	Analyze the technologies for virtualization based security enhancements
		CO4	Analyze legal and Compliance issues and examine modern security standards
		CO5	Develop and implement various algorithms for encryption and decryption algorithms i.e., AES, MD5 and RSA algorithms

Academic Professor -I/C

HOD-CSA

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